Marine Corps Warfighting Lab

Royal United Services Institute

C4ISTAR Requirements for War-fighting: From Afghanistan to Project Metropolis

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Presentation Outline

- Marine Corps Warfighting Laboratory.
- Enduring Freedom Combat Assessment Team (EFCATS).
- C4ISR lessons from Afghanistan.
  - Observations and MCWL actions.
- USMC Concepts and Experimental Plans.
- Concluding thoughts.

Commandant's Guidance

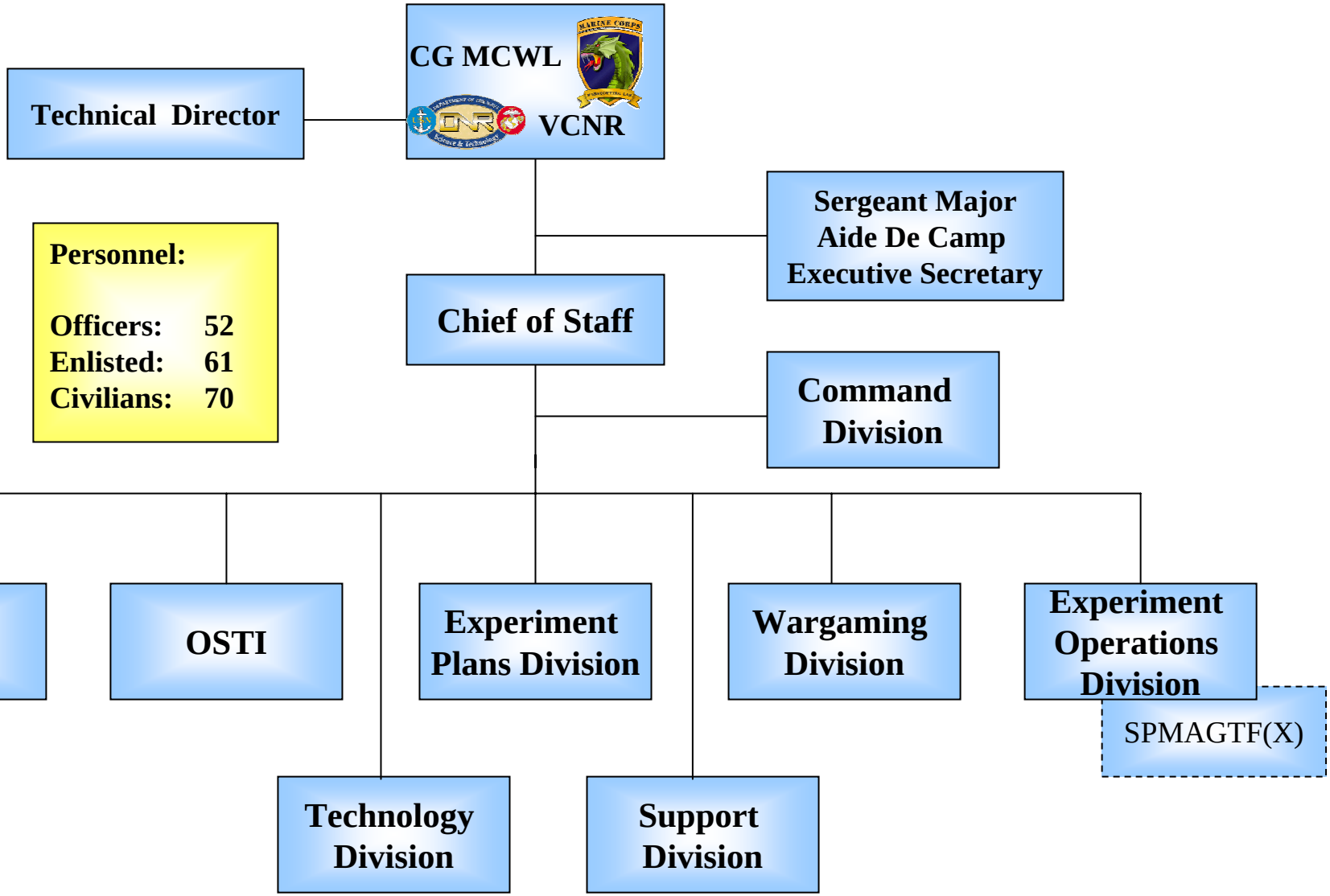
- A process for rapid military innovation while meeting current commitments
- A means for insertion of science & technology to enable the warfighter

- Operating Forces are our focus of effort
- Need intermediate initiatives within the framework of existing technologies to remain relevant

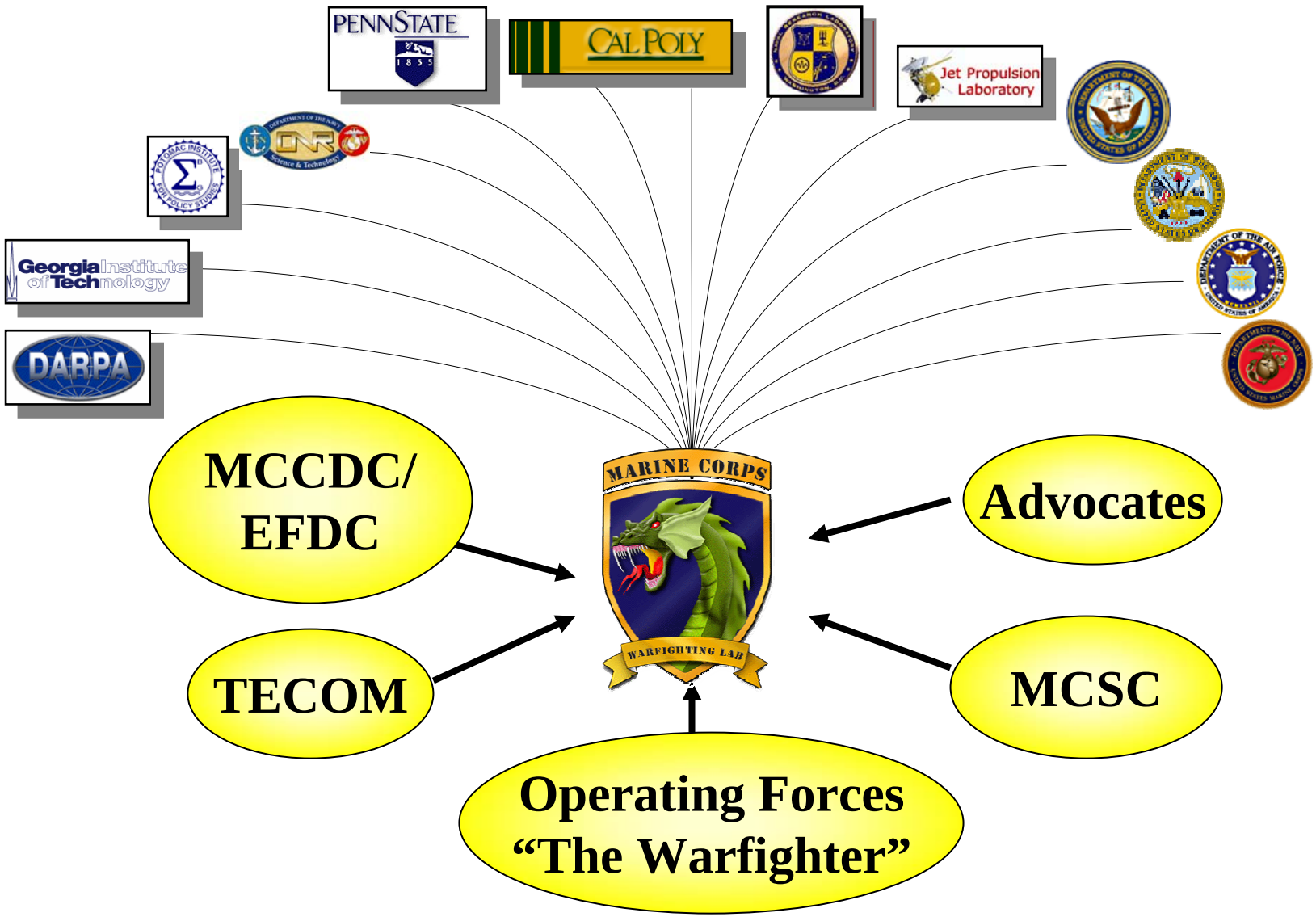
Marine Corps Warfighting Lab

- MCWL falls within the Marine Corps Combat Development Command (MCCDC) Quantico, Va.
- **Purpose**: To improve Naval expeditionary warfighting capabilities *across the spectrum of conflict for current and future operating forces:*
  - **Supports** advocates (Ground,Air, Command and Support)
  - **Conducts** Wargames and Experiments to evaluate new tactics, techniques, procedures, and technologies.
  - **Forwards** results to Combat Development System with recommendations for action.

MCWL Organization

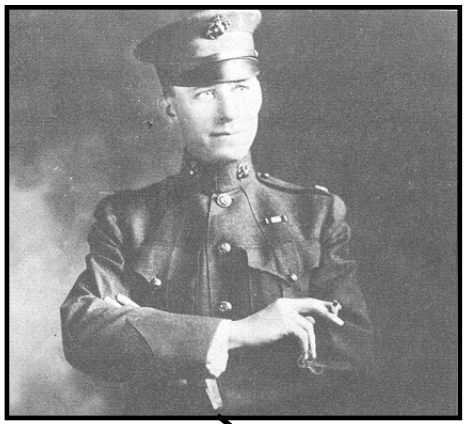


Integrated Team Effort



Navy / Marine Corps Innovation Tradition

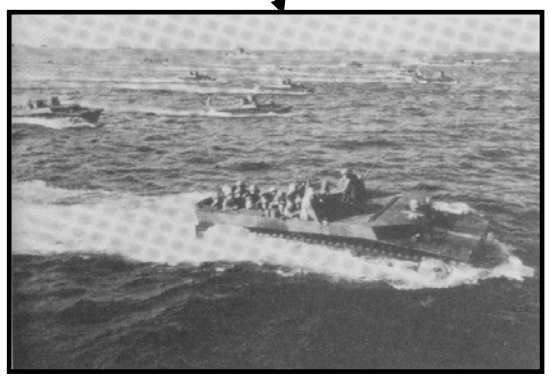
Early Concept



Wargaming

Fleet Experiment

Warfare Capabilities



Joint Experimentation

Millennium Challenge 2000

Millennium Challenge 2002

Olympic Challenge 2004

Pinnacle Challenge 2005

1997

1999

2001

Millennium Dragon 2002

Olympic Dragon 2004

Pinnacle Dragon 2005

USMC Supporting Experiments

2002 2004 2005

Service Major Experiments Realigned to Support Joint Experimentation

Afghanistan Lessons Process

- Enduring Freedom Combat Assessment Team (EFCAT):
  - 26 military: 2 civilian analysts in Bahrain and forward to document and collect data.
  - 34 and 1 in MCCDC Quantico to collect, develop, analyze, assess and prepare reports.
- Immediate capture of issues and lessons learned:
  - Input to Expeditionary Force Development System.
  - Available to all staff and units across USMC.
  - http://efcat.mccdc.usmc.mil

ISTAR issues

- 85 EFCAT ISTAR issues:
  - Standard Maps and Precision Targeting.

Target Handoff System Experimental

THS(X)

PURPOSE

•A universal combined arms targeting software designed to increase effective employment of combined arms by increasing the situational awareness of a Forward Air Controller (FAC), Forward Observer (FO), or Naval Gunfire Liaison Officer's (NGLO)

DESCRIPTION

•A ruggedized handheld computer with imbedded GPS, laser range finder, and MBITR radio with the ability to process lased target as a fire mission for ground, air, and naval surface fires simultaneously or separately and then pass that fire mission digitally to the firing agencies/aircraft.

- •Simplified & intuitive GUI to ensure faster response/training.
- •Scalable color map display with GPS centering for advanced situational awareness/mission execution/safety planning.

ISTAR issues

- 85 EFCAT ISTAR issues alone:
  - Standard Maps: Precision Targeting.
  - Common Theater Intel Database.
    - Integration of other Govt Agencies.
    - Coalition environment.
  - Lack of organic UAV
    - Imagery and comms.

Dragon Eye

- Back-pack unmanned aerial vehicle.
- Interchangeable modular payloads.
- Battalion/Company level.
- Autonomous flight requires minimal training.
- Mission programming via GPS registered 1:50,000 digital map projected on a rugged PC.

• Wingspan	2.4 ft
• Length	2.4 ft
• Height	0.7 ft
• Gross Wt	5.0 lbs
• Msn Payload	1.0 lbs
• Link Range	5-10 km

- Electronic Propulsion
- Forward/Side looking color cameras
- Un-cooled IR camera in development
- Navigation via Global Positioning System

- Estimated Performance:
  - 0.75 hr endurance
  - 5-10km max range
  - 45 kt IAS

Dragon Warrior

- Shipboard compatible
- Fully autonomous, vertical takeoff and landing UAV
- Designed for the Marine Infantry Regiment/MEU.
- Supports tactical operations with a Reconnaissance, Surveillance, and Target Acquisition (RSTA) and communications relay capability.

Length	9.0 ft fuselage and 9.0 ft rotor.
Range	50nm and 20,000 ft ceiling.
Max Gross Wt	310 lbs.
Payload Weight	25-35 lbs depending on mission profile.
Power Plant	Heavy Fuel Engine.
Endurance	3-5 hours depending on mission profile.
Payloads	Electro-optical and Infrared gimbal w/laser rangefinder (Laser designator is in development)

ISTAR issues

- 85 EFCAT ISTAR issues alone:
  - Standard Maps: Precision Targeting.
  - Common Theater Intel Database.
    - Integration of other Govt Agencies.
    - Coalition environment.
  - Lack of organic UAV
    - Imagery and comms.
  - HUMINT vital:
    - Need for long range secure comms.
  - Ground sensors

Reconnaissance Surveillance and Target Acquisition (RSTA)

PURPOSE

Develop a reconnaissance, surveillance and target acquisition network and supporting concepts that enhances the capabilities of the warfighter.

ONGOING PROGRAMS

- Urban Ground Reconnaissance Tactics Techniques and Procedure (TTP) Development
- Urban Eyes Experiments
- Expeditionary Sensor Surveillance System
- RSTA Concept Development

BACKGROUND

Project RSTA integrates the development of a sensor grid and its sensor components into a coherent, tactically relevant system. The sensor grid is composed of all available sensors in the battlespace – human, automated sensors, unmanned ground and aerial vehicles.

Dragon Runner

OBJECTIVE:

•Elevate situational awareness / extend limit of human observation (around the corner capability)

•Provide a limited, tactical force protection capability at the small unit level (“Sentry Mode”)

•Provide a man-portable system that will provide observation coverage in confined areas

•Increase real-time feedback to the small unit leader

DESCRIPTION:

•4-wheel, rear-wheel drive, front wheel steer

•System weight 13 lbs (9 vehicle, 4 OCU)

•Length: 15.5” Width: 11.25” Height: 5”

•Low Light Level wide angle video camera

•Infra-red LEDs for night use

•Motion sensors for “Sentry Mode”

•Earpiece for audible alert during “Sentry Mode”

•2-sided non-active suspension for inverted operation

•Standard military batteries (vehicle / OCU)

•2-hr full function, 12-hr sentry mode

•User Interface uses 4” screen for video and home gaming controller for operation

Urban RSTA Technology

DESCRIPTION:

- Day E/O camera
- Night Thermal Camera
- Camouflage for the Urban environment
- Automatic power up upon detection
- 8mm recording capability
- Range: line of sight
- Power: BA 557

OBJECTIVE:

- Elevate situational awareness/extending the limit of human observation (day/night) at the small unit level.
- Provides security.
- Enhances Force Protection.
- Provides eyes on the objective for small tactical forces

Command Element Issues

- 45 EFCAT C4 issues:
  - Systems Support:
    - Graphics/ Chat/VTC/Terrain Mapping/Batteries.
  - LOs essential.
  - Blue Force Tracking.

Zinc-Air Technology

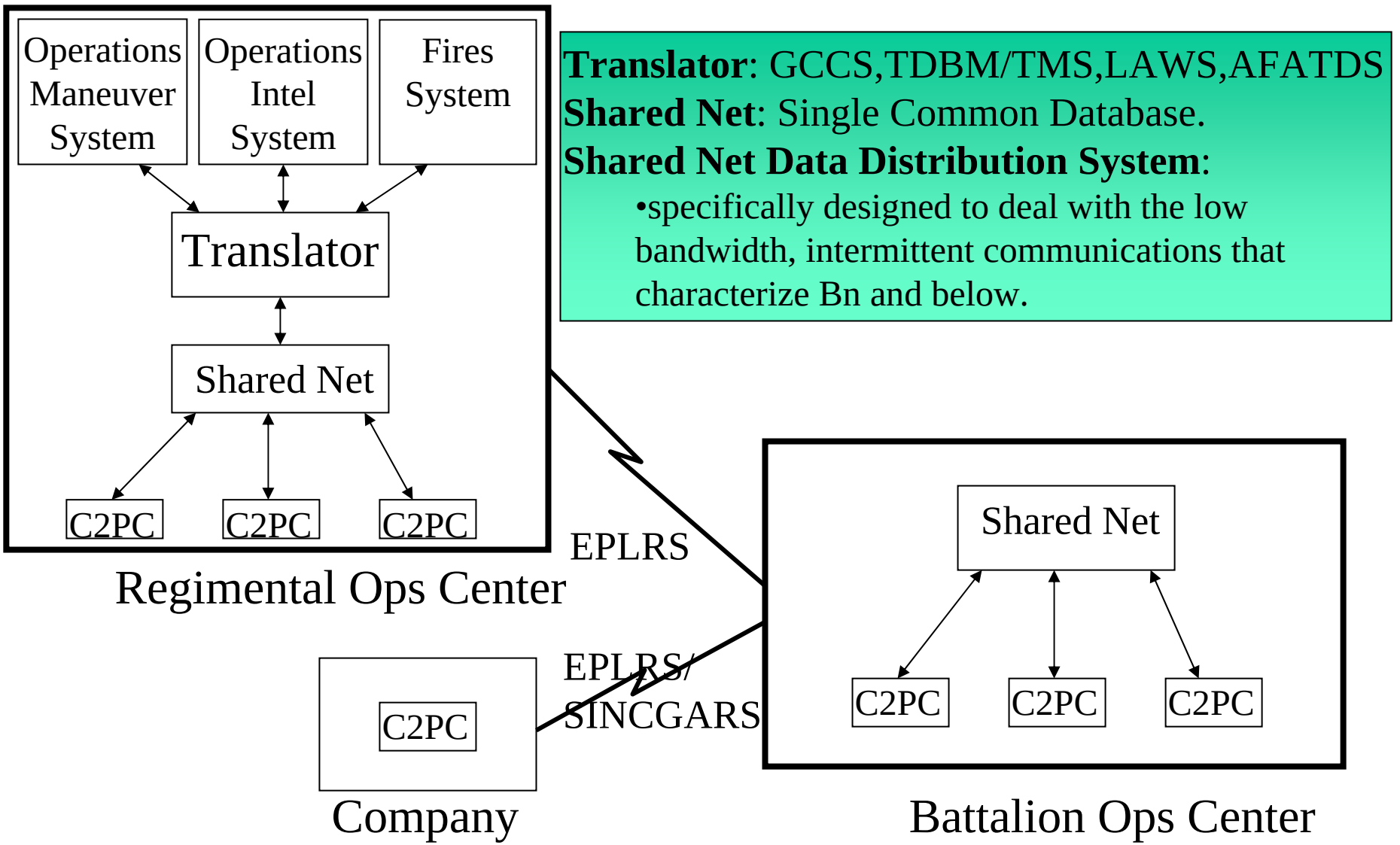
DESCRIPTION:

- 6-9 day life for PRC-119/113 Radios.
- Equivalent to 5 BA-5590's
- Weight: 5.5 lbs
- Prod. Cost (est.): $200.00
- .20 per watt
- Requires Oxygen
- Shelf Life (In the wrapper): 2-3 years
- Out of the wrapper: 30-45 days.
- Non-Hazardous in 45 States (comparable to an alkaline battery)
- US Army assigned BA Number/National Stock Number (NSN).

OBJECTIVE:

- Determine if the Zinc-Air Battery is a valid alternate power source for USMC Operating Forces.

Command & Control Integration



Translator: GCCS,TDBM/TMS,LAWS,AFATDS
Shared Net: Single Common Database.
Shared Net Data Distribution System:

- specifically designed to deal with the low bandwidth, intermittent communications that characterize Bn and below.

Command Element Issues

- 45 EFCAT C4 issues:
  - Systems Support:
    - Graphics/Terrain Mapping/Chat/VTC/Batteries.
  - LOs essential.
  - Blue Force Tracking.
  - SOCOM/SF interoperability.

USMC Contribution to SOCOM

- General Officer at SOCOM
- Integrated USMC Unit formed during FY-03
  - Reconnaissance
  - Intelligence
  - Fire Support
- OPCON to SOCOM

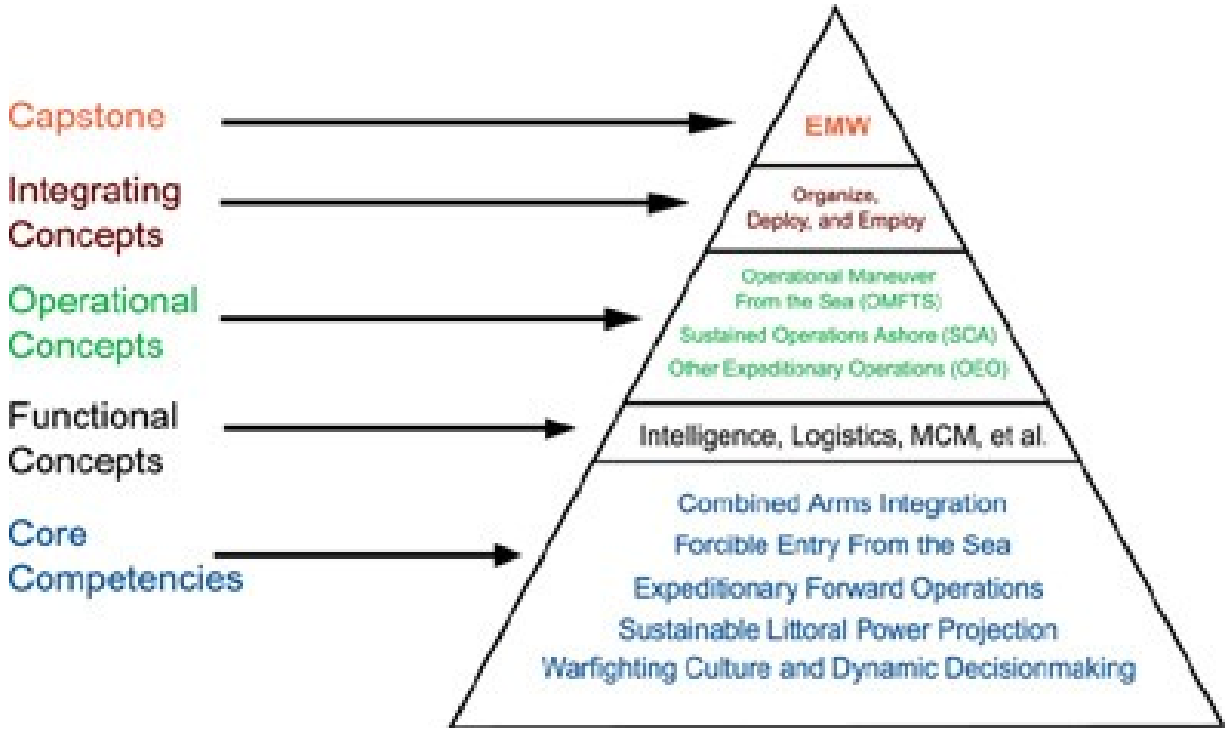
Command Element Issues

- 45 EFCAT C4 issues:
  - Systems Support:
    - Graphics/Terrain Mapping/Chat/VTC/Batteries.
  - LOs essential.
  - Blue Force Tracking.
  - SOCOM/SF interoperability.
  - Over the Horizon (OTH) and On the Move (OTM) secure comms:
    - Ranges, dispersion, remoteness.

OTH/OTM Secure Comms

- Ranges from Rhino to beach and ship.
- Asymmetric battlefield:
  - Dispersion of tasks too great for ground (& air) relay.
  - Remoteness e.g. HUMINT LOs.
- Lack of SATCOM equipment and access.
- Better use of HF (Auto Link Establish).
- Lack of comms on the move.

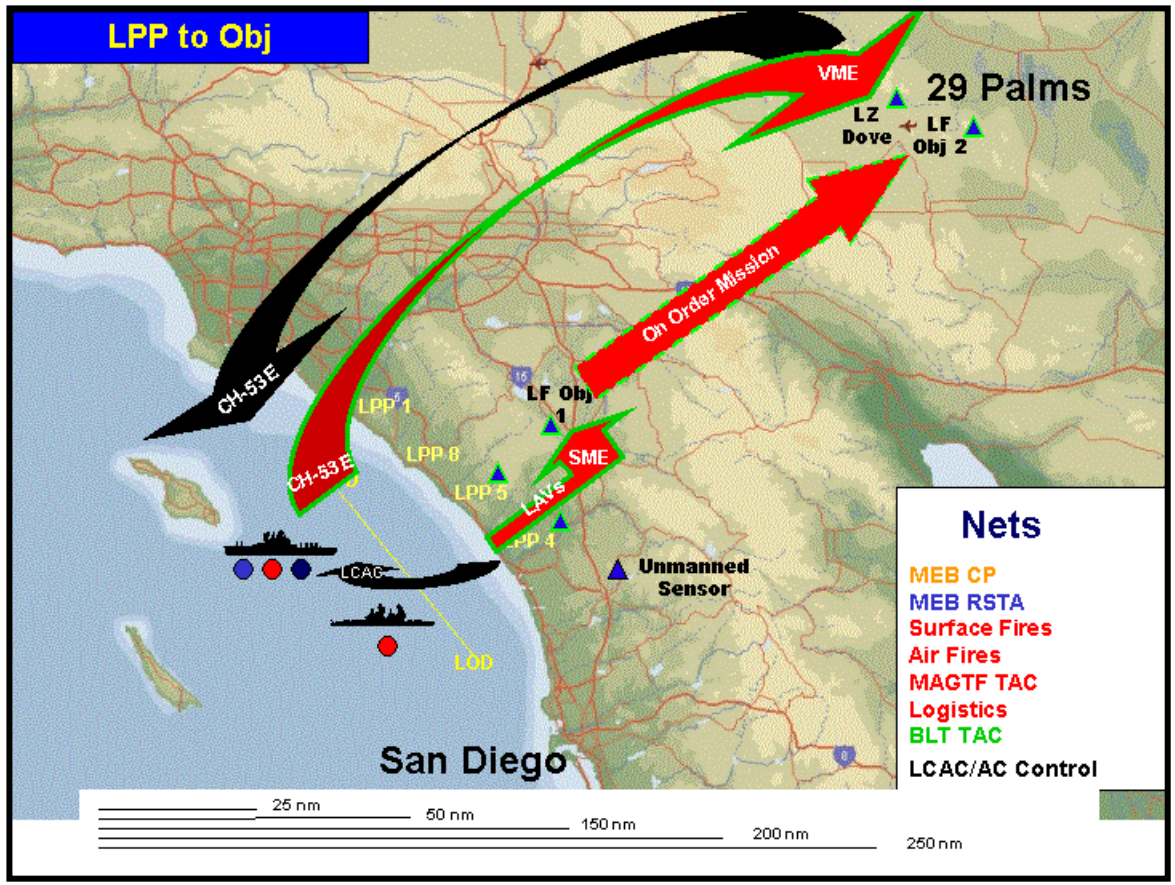
Marine Corps Concepts



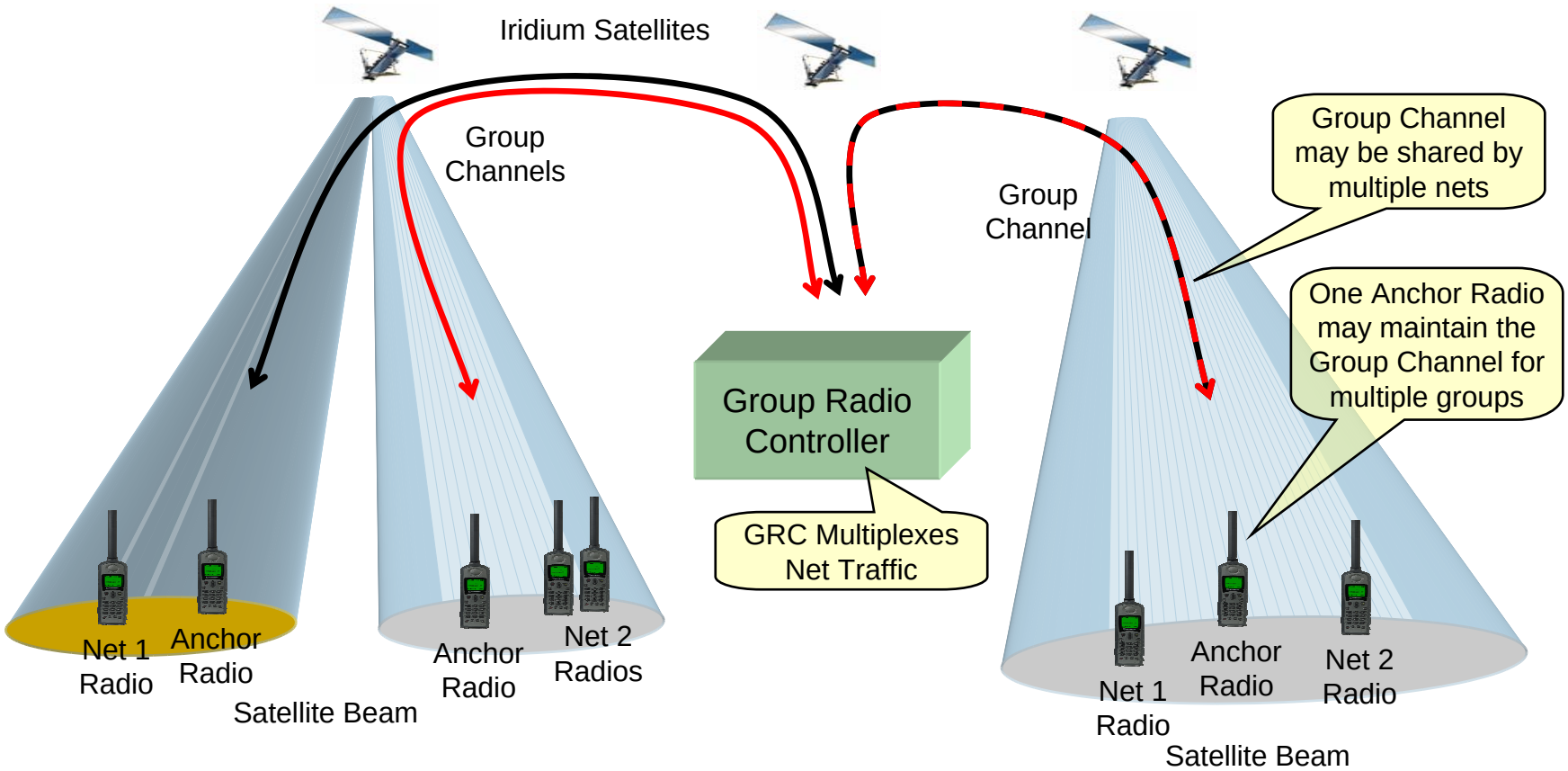
- EMW : Expeditionary Maneuver Warfare.
- OMFTS : Operational Maneuver from the Sea.
- STOM : Ship to Objective Maneuver.

Olympic Dragon 04

- CONOPS
  - Seabased MEB and ESG
  - Joint Force Enabler
  - Rapid Decisive Operation
- Framework
  - STOM in support of RDO
  - 2020 Capability Timeframe
- Series of Workshops, Wargames, Modeling & Simulation and LTAs.
- Culminating Live Experiment
  - Summer 2004
- Experimental C2 Architecture
  - OTH/OTM Comms
  - Common Tactical Picture



Expeditionary Tactical Communications System



Modified IRIDIUM to provide Netted OTH Communications

Expeditionary Tactical Communications System

- **Modified Iridium 9505 Handset:**
  - Lightweight – about 24 ounces.
  - Commercial encryption.
  - Embedded GPS receiver gives user time and position.
  - Standard RS232 interface for sensor or terminal connections.
- **Anchor in ship/veh/craft maintains open channel to Group Radio Controller (GRC)**
- **Enables Ship-to-Objective Maneuver (STOM) experimentation on OLYMPIC DRAGON 04.**

Iridium Series 9505 Phone – shown without antenna

Objective:

Urban?

MOUT associated Projects

- Project Metropolis
- Urban Ground Reconnaissance
- MOUT ACTD

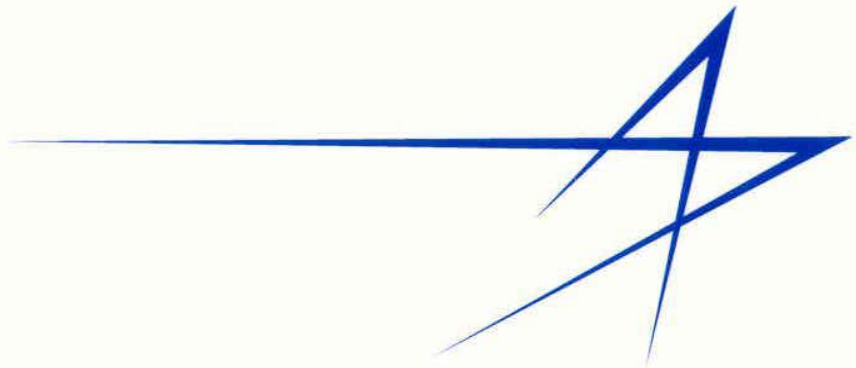
Jan/Feb 01	Mar/Apr 01	Jun 01	Jan/Feb 02	Jul 02
Conduct Battalion level combined arms exp.	Publish Increment 2 Report	Conduct Plt level KB(X) Block 2 exp. Campen	Conduct Company level Block 2 exp. CLNC	MC 02 Urban Cax exp. George, AFB

Concluding Thoughts

- Afghanistan lessons:
  - Many being addressed
- Explored USMC Concepts:
  - EMW/OMFTS/STOM with urban focus.
- Future Urban: complex and asymmetric.
- MCWL focus on warfighter shortfalls within USMC at the tactical level:
  - Projects :*RSTA*, *C2* and *Metropolis developing into the Tactical Warrior series of experiments*
  - Experimentation Focus: Olympic Dragon 04.

Questions?

- Further information:
  - Concepts at Marine Corps Combat Development Command (MCCDC):
    - www.mccdc.usmc.mil
  - Marine Corps Warfighting Lab (MCWL):
    - www.mcwl.quantico.usmc.mil
    - Lt Col N J Cusack RM (cusackn@mcwl.quantico.usmc.mil)



LOCKHEED MARTIN